PART 3

LEVEL 1 MODELS

Chapter 2. MICHTOX Recommendations

MICHTOX was adapted from the general model, WASP4, and has served well as a screening-level model for Lake Michigan over the past several decades. Much of the model development took place prior to the availability of an extensive data set collected for the Lake Michigan Mass Balance Project (LMMBP) during 1994-1995 and, therefore, depended heavily on existing historical data. In contrast, the LM2-Toxic model and LM Food Chain model were constructed using the most recent data from the LMMBP. Some of the advantages of using LM2-Toxic instead of MICHTOX as a screening-level model for future contaminants of interest include the following:

- LM2-Toxic has a significant amount of documentation.

- LM2-Toxic algorithms are all contained within the WASP code, whereas MICHTOX utilizes Excel spreadsheets for some of the calculations. This makes code modifying in LM2-Toxic easier.

- LM2-Toxic automatically corrects the Henry's Law Constant for temperature.

- LM2-Toxic has a better treatment of carbon (including having biotic and abiotic carbon and carbon decay).

- LM2-Toxic is as easy and fast as MICHTOX in preparing model runs for similar numbers of state variables.

- LM2-Toxic utilizes output from the hydrodynamic model to compute advective flows and vertical exchanges.

- LM2-Toxic carbon state variables are from the LM3-Eutro model for defining autochthonous carbon generation.

- LM2-Toxic handles sediment as a limited source for resuspension; whereas, MICHTOX does not.

- LM Food Chain has more organisms in its food web.

- LM2-Toxic has a higher spatial resolution in both the water and sediment. This higher resolution allows one to utilize this resolution if data sets related to a new contaminant of interest are well-populated.

Therefore, future enhancements of MICHTOX are not warranted.